PRESENTATION

REAL ESTATE STRATEGY IMPLEMENTATION PLAN FY 2019

PREPARED FOR ARIZONA STATE RETIREMENT SYSTEM

June 14, 2019

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ASRS 2019 IMPLEMENTATION PLAN
GOALS AND OBJECTIVES

The objective of the Implementation Plan is to prepare an updated "Pacing Plan" for the Real Estate Portfolio that aligns with the investment opportunities outlined in a recommended "Model Allocation" as well as the ASRS Strategic Asset Allocation Policy Investment Strategy ("SAA") approved in June 2018.

To accomplish the above objective, RCLCO reviewed the ASRS Portfolio, policies and limitations, previous recommendations and activities, as well as current and forecasted economic, capital market, and property market conditions.

Based upon an evaluation of these factors, the current plan provides revised target portfolio allocations, target investments, and commitments—the "Pacing Plan"—that should take place annually based upon projected opportunities driven by market and investor dynamics, the real estate cycle, and ASRS' real estate goals and objectives.

Long-term goals and objectives that the Implementation Plan works to achieve include:

- Target a real estate allocation of 20% (recently increased from 10% to 20% ± 10% per the ASRS SAA);[1]
- Target a net return expectation that outperforms ODCE by at least 100 bps for a given period;
- Target a "Model Allocation" by property type for:
  - "Where People Live" (Apartments, Senior Housing, Student Housing, Self-Storage);
  - "Where People Work" (Office, Health Care, Hospitality);
  - "Where People Shop" (Retail and Industrial);
- Target appropriate levels of risk/return based on property stage/risk profile;
- Target an allocation to a range of investment vehicles that provide transparency and control and appropriate levels of fees.

We recommend that the long-term allocation targets within these objectives continue to be evaluated and revised at least annually to reflect near-term trends that may impact long-term decisions.

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[1]The allocation to Real Estate as part of the total ASRS fund was modified since the adoption of the ASRS Strategic Plan in 2003. The revised target increased from 6% of the total ASRS Portfolio to 8% in 2014, 10% in 2015, and subsequently increased further to 20% in 2018.

ASRS 2019 IMPLEMENTATION PLAN
GUIDING PRINCIPLES

PORTFOLIO CONTROL

ASRS pursues relationships and investment vehicles that maximize alignment, provide transparency, provide liquidity through control of investment periods, financing, and exits, and allow for the opportunity to review compliance with criteria on each investment. In practical terms, this has meant:

- Greater emphasis on strategic manager relationships through both separately managed accounts (“SMAs”) and direct investments in operating and/or investment companies;
- Proactively identifying opportunities offering superior investment fundamentals, and identifying “best in class” vehicles for each strategy;
- Monitoring manager relationships to ensure alignment with strategy and investment criteria, and, as necessary, modifying strategies to reflect the external environment.

RISK MANAGEMENT

ASRS aims to exceed performance of real estate benchmarks over the long-term by taking, and managing, three primary types of risks:

- Economic cycle risk:
  - Real estate, like the broad economy albeit more so, is inherently cyclical due to elasticity of demand and inelasticity of supply.
  - Achieving consistent positive performance requires monitoring and proactively preparing for each stage of the cycle.
  - Cycle-driven distress resulting from failure to achieve business plans and/or market illiquidity creates opportunities for long-term oriented investors.
- Business risk:
  - Business risk in real estate is primarily derived from the ability of operators to control costs and attract tenants/buyers.
  - Managers and investors manage these risks through maintaining market and product knowledge, performing effective due diligence, and profiting from imbalances of information in this inherently inefficient asset class.
- Property life cycle risk:
  - The three primary life cycle classifications include Stabilized, Value Enhancement, and Construction.
  - Value Enhancement is comprised of Renovation & Lease-up/Roll assets, and Construction is comprised of Build-to-Suit, Spec, Pre-Construction, & Entitlement.

Other economic risks are largely outside the control of any single investor. These risks are primarily managed by understanding their potential impacts and by taking reasonable cycle and business risks.

RECAP: FY '17 & '18 RECOMMENDATIONS & ACTIONS

	RECOMMENDATIONS	ACTIONS

Total Portfolio	• Make progress towards SMA Model Allocation
	• Focus primarily with SMA managers on "operations," particularly in leasing and stabilizing assets
		• As of June 2018, SMAs and the investment in Mill Creek Residential Trust ("MCR") accounted for approximately 61% of the Real Estate Portfolio as defined in the recently approved ASRS Investment Strategy (further grew to approximately 62% as of Q4 2018).
		  ○ Since FY 2016, approximately $1B in contributions funded over $800M in equity for 37 new acquisitions and on-going investments needs (e.g., construction funding).
		  ○ New acquisitions comprised of 40% in "Where People Live", 43% in "Where People Work" and 17% in "Where/How People Shop"
		  ○ The value of the Portfolio's investments also increased by approximately $2.0B during the same time period.
		• SMA portfolio occupancy remains strong at approximately 82% despite several Class A Multifamily SMA, Multi-Asset SMA and Senior Living SMA development projects coming on-line.

New SMAs & Other Investments	• Consider new SMAs & explore new strategies (e.g., SFR Rental Development, Hotels, Additional Geographic Focus, Seniors Housing) given any additional "dry powder"	• Acquired a significant ownership interest in MCR for $450 million (50% in the Operating Company & 87.5% in a Legacy Portfolio comprised of GP interest in existing properties)
		• Finalizing negotiation of venture documents/term sheets for New York/Boston Sharpshooter, Single Family Development and Single Family Rental, Hospitality and a $300 million commitment increase for the Southern California Value- Add
		• Implemented three new SMAs and increased commitment amounts for several SMAs:
		  ○ Small Bay Industrial SMA: $150 million; commitment; increased by an additional $200 million (2019).
		  ○ Medium Size Industrial SMA: $150 million.
		  ○ Preferred Equity SMA: $300 million (2019)
		  ○ Multi-Asset SMA: Increased commitment a new SMA with total commitment to this SMA Manager now at $1.0 billion.
		  ○ Senior Living SMA: Increased commitment by $100 million; total SMA commitment is now approximately $300 million.
		  ○ Medical Office SMA: Increased commitment with a new $300 million SMA (total commitment is now $500 million).
		• Currently evaluating two platform investments:
		  ○ Fund Management Platform.
		  ○ Industrial Operating Platform.

Existing SMAs & Other Real Estate Investments	• Consider sale of select SMA assets to take advantage of peak valuations and generate additional dry powder and/or as a rebalancing measure given strategic exposure requirements	• Sold MD Industrial asset, which yielded an $8.1M realized gain to ASRS. • Sold portfolio of MN Self-Storage assets, which yielded an $4.1M realized gain to ASRS. • Sold FL Industrial asset, which yielded a $15M realized gain to ASRS. • Sold all Land Banking projects, which yielded over $10M in realized gains to ASRS. • Sold VA MOB Portfolio, which yielded a $3.2M realized gain to ASRS. • Sold Denver Multifamily parcel, which yielded a $1M realized gain to ASRS. • Real Estate Portfolio distributions totaled $1.2B for FY 2017 and FY 2018 translating to a quarterly average of $150M. • The above transactions and sales from a Condominium Co-Investment and a SMA Condominium investment have already returned all invested capital. • Pending sales: Student Living Portfolio

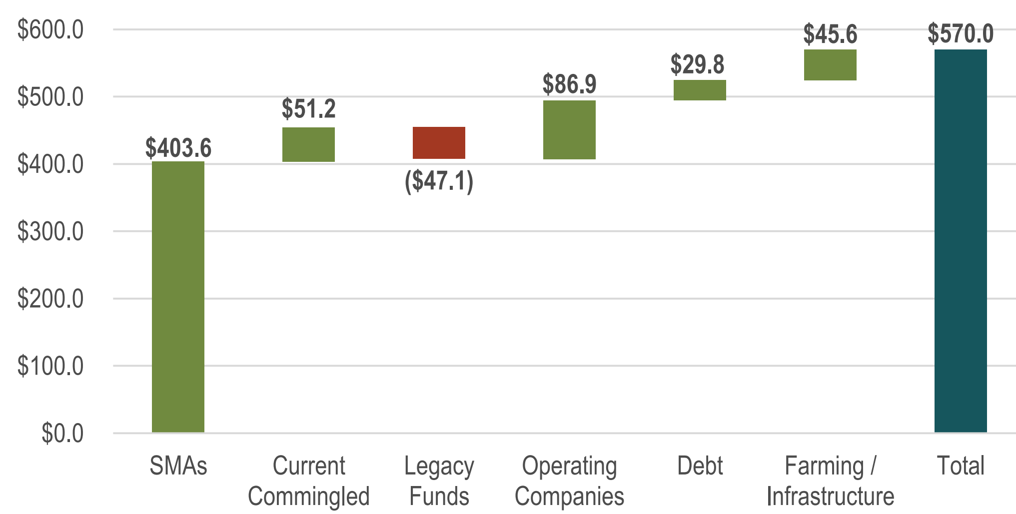
PORTFOLIO PERFORMANCE
ATTRIBUTION BY INVESTMENT VEHICLE AS OF Q4 2018

- The ASRS Real Estate portfolio has outperformed NCREIF NFI-ODCE ("ODCE") benchmark by 165 basis points since inception through Q4 2018, which translates to a Dollar Value Add ("DVA") of $570M.
- The primary driver of excess returns were ASRS' investments in SMAs and Operating Companies, highlighting the positive benefits of direct investing and supporting RCLCO's continuous recommendation to increase the portfolio's allocation to such vehicles.
- Legacy funds continue to be a drag on the portfolio's returns but ASRS has made strides to decrease holdings in these funds over the past several years and expects to fully exit these investments by 2024.

ASRS Real Estate Portfolio Performance Since Inception

Investment Vehicle	Since Inception Net IRR	Since Inception Excess Net IRR	Dollar Value-Add (millions)
Separate Accounts	13.9%	5.1%	$403.6
Current Commingled	11.3%	1.5%	$51.2
Legacy	5.8%	-0.3%	($47.1)
Operating Companies	17.2%	9.4%	$86.9
Debt	11.7%	2.2%	$29.8
Farming / Infrastructure	7.7%	1.9%	$45.6
Total Return	**8.8%**	**1.7%**	**$570.0**

Dollar Value-Add by Investment Vehicle (Millions)



SMA PERFORMANCE

ATTRIBUTION BY SECTOR WEIGHTING & LIFE CYCLE AS OF Q4 2018

- The SMA portfolio has outperformed the ODCE benchmark by 510 basis points since inception through Q4 2018, equating to a DVA exceeding $400M.
- The SMA portfolio has not benefitted through the implementation of different sector weightings compared to the benchmark because:
  - "Live" assets within ODCE underperformed the benchmark (while ASRS has had an over-allocation to this sector). RCLCO does not believe the recent historical performance to be indicative of the long-term trend (discussed further in the performance forecast section).
  - "Shop" assets within ODCE outperformed the benchmark (while ASRS has had an under-allocation to this sector).
- In terms of Life Cycle, the SMA portfolio has greatly benefited by undertaking more Value-Enhancement and Construction risk compared to ODCE with approximately 570 basis points (or $460M DVA) of excess return or outperformance.

SMA Performance Attribution Since Inception

	Weighted Excess Net IRR	Dollar Value-Add (millions)
Sector Weighting[1]		
Live	-0.38%	($40.0)
Work	0.04%	$5.4
Shop	-0.22%	($22.4)
Subtotal	-0.57%	($57.0)
Life Cycle[2]		
Stabilized	0.18%	$7.8
Value-Enhancement	2.99%	$193.0
Construction	2.50%	$259.8
Subtotal	5.67%	$460.6
Total Excess Return	**5.10%**	**$403.6**

Dollar Value-Add by Sector Weighting ($M)

Dollar Value-Add by Life Cycle ($M)

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[1]Calculates excess return generated by RCLCO's model allocation weightings by property type versus ODCE.
[2]Calculates excess return generated by the performance of value creation activities (i.e., Value-Enhancement and Construction) compared to ODCE.

PROGRESS SINCE 2011
LESSONS LEARNED

We evaluate performance both quantitatively (primarily reflected by returns) and qualitatively (illustrated by the quality of relationships, defined by their control/transparency and terms/features favorable to ASRS, access to attractive investment opportunities, mitigation of risks, and administrative efficiency). We identified several primary "lessons learned" below in order to guide investment and asset management improvements going forward.

LESSONS LEARNED	STRATEGIC IMPLICATIONS
Demand and Supply – It's the Law	• Evaluating underlying demand fundamentals and forecasting a demand/supply outlook for real estate markets and submarkets is the cornerstone of prudent real estate due diligence. • "Demand-driven" investing recognizes that the primary risk to real estate investment performance is that a building will not attract tenants/buyers. Gaining confidence for enduring demand exists for the product amidst manageable new supply is far more important than securing what may appear to be a low basis. • Demand is driven by both "macro" and "micro" factors → need to understand both national and local market drivers and fundamentals.
Quality of Leadership Matters	• Strong, effective leadership, and involvement by leadership in the management of an SMA consistently sets high-performing SMAs apart. • Evaluation of 5-6 years of experience across 15 SMAs suggests that successful partnerships, looking at both quantitative and qualitative metrics, feature enhanced involvement by the managers' more senior executives (CEO/President/Managing Partners, or at least their direct reports). • Underwriting should therefore emphasize review of senior leaders and evaluate their intended involvement in their companies over the long-term, and in the ASRS relationship specifically. • Key person provisions in operating agreements should respond to the leadership roles and abilities that have been determined through due diligence, and should provide options or exit rights to ASRS that reflect the importance of this factor.
Communication and Transparency Are Key	• Communication is fundamental to success but is not always the default paradigm → demand transparency and equal access to good and bad news to drive proactive decisions. • The manager's culture of and skills in communication continue to be emphasized in due diligence, including in detailed manager interviews and in reference interviews. • Once on board, we must maintain frequent and regular touch points with managers, including: ○ In-person onboarding of all new SMA Managers; ○ Minimum monthly telephone check-ins on operations and pipeline; ○ Minimum semi-annual in person check-ins by relationship managers and asset management. • Strategic on-going monitoring of assets and managers: ○ Rank and assess SMA manager and asset performance; ○ Interim operating agreement compliance reviews; ○ Codify annual asset review metrics/findings into eyecharts; ○ Regular and ongoing benchmarking to Final Certification Underwriting, latest Annual Asset Reviews and budgets.

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PROGRESS SINCE 2011
LESSONS LEARNED

LESSONS LEARNED	STRATEGIC IMPLICATIONS
Strategic Use of Leverage Can Unlock ASRS Portfolio Value	• In order to maintain limited "cash drag," ASRS must sell assets whenever it purchases other assets, sometimes making it difficult to pursue attractive investment opportunities if it's undesirable to sell assets or markets are illiquid. This is particularly difficult in a real estate downturn, in which attractive properties could be acquired at low bases, but only if ASRS were willing to sell other assets into a bear market. • ASRS is therefore exploring how to mitigate this challenge through the use of low cost credit facilities to enable acquisitions through all phases of the cycle. • This allows ASRS to leverage its scale and borrowing capacity to enhance performance and reduce leverage risk within its Real Estate Portfolio: ○ The existing approach, in which leverage is always secured at the asset level, is passive (ASRS simply accepts terms offered by bank to managers) and inefficient (more expensive due to the inferior quality/credit of the borrower, often an asset-level LLC). ○ ASRS could employ leverage at the total fund or real estate portfolio level to lower its overall cost of debt, provide more efficient debt execution to managers, and generally provide for greater control and transparency over its portfolio leverage. • In order to facilitate this, RCLCO has to deepen capital markets knowledge at asset level, SMA level, and the Total Portfolio.
Strive to Reduce Overruns Through Deeper Dives	• Next to the market (whether properties will attract and retain tenants), construction cost overruns present the greatest risk to anticipated returns. • Though construction costs have risen dramatically over the last few years, we recognize that "deeper dives" during diligence would have provided us with more transparency into construction assumptions. Greater transparency may not have modified outcomes, but it could have led to better decision making and more accurate forecasting. • RCLCO will continually improve and deepen development and construction expertise/resources: ○ Implement strategic relationships with external construction and engineering consultants to evaluate all development and significant construction project budgets and timelines, and/or develop construction expertise "in house." ○ Leverage development portfolio to build internal knowledge base covering project performance.
Core is Inevitable	• Consistent with the product life cycle, all investments in development and value-enhancement will eventually transition to more stabilized assets, particularly as we stay true to the demand-driven approach to investing. • As the Portfolio transitions toward stabilization, RCLCO must proactively ensure that ASRS is taking sufficient risk to maintain target returns: ○ Maintain target levels of investments in riskier strategies (Construction and Value-Enhancement) based on where the market is in the cycle. ○ Actively monitor and manage the Portfolio in order to prune underperforming assets or those at peak values. ○ Conduct rigorous hold/sell analyses based on whether the asset is likely to continue to be accretive to the ASRS real estate benchmark at appropriate levels of risk. Analyses will evaluate "since inception" returns, cash-on-cash returns, and go-forward IRRs in order to make recommendations.
Enhance Speed and Flexibility to Market	• The current process of leveraging RCLCO to "certify" investments that meet investment criteria has enabled ASRS SMAs to pursue attractive transactions with very short diligence timeframes. The existing approach does not allow for quick approval of attractive opportunities from outside managers, particularly "one-off" investments that generate strong returns but may not represent strategic investment initiatives. • Designing and implementing a process for "one-off" investments may be an opportunity. Key governance features may include: ○ Roles of ASRS staff and RCLCO; ○ Multi-asset investment guidelines; ○ Standardized terms and documents; ○ Return hurdle ranges by product type and risk profile (i.e., development, significant value add, light value add).

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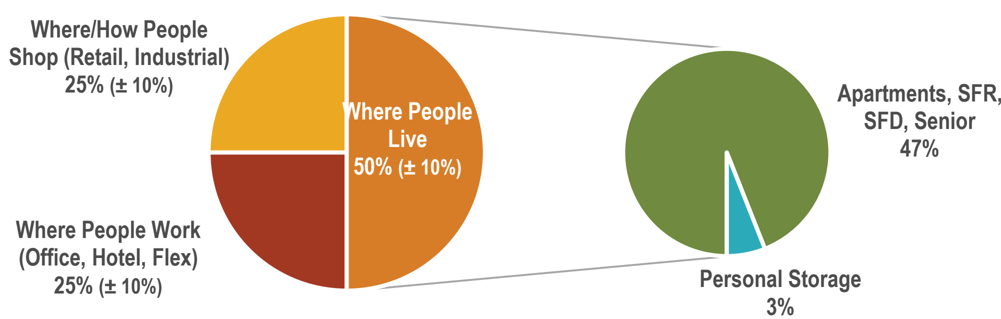
ASRS 2019 IMPLEMENTATION PLAN
REAL ESTATE PROGRAM

- The Real Estate Program provides the following benefits to the overall ASRS Portfolio:
  - Achieve returns commensurate to the underwritten risk, that are generally protected against inflation.
  - Generate regular cash flow from stabilized properties.
  - Enhance the overall diversification of the ASRS investment program.
- Successful real estate investing results from the following strategies:
  - Actively managing those assets providing stabilized returns from cash flow in order to maintain and grow income over the hold period.
  - Assume life cycle or market risk to actively create/restore value for realization to stabilized hold.
  - Tactically allocate to strategies favored by market dynamics during isolated periods of time.
- Risk/Return Profile: The Portfolio should consist of both stabilized and value enhancement investments:
  - Stabilized: Substantially leased properties that provide predictable income flows with relatively lower levels of risk.
  - Value Enhancement (Renovation & Lease-Up/Roll): Properties and/or investment strategies that require specialized expertise and should achieve higher returns (through appreciation and/or cash flow) due to their increased risk associated with repositioning, specific market factors, lease-up, leverage, etc.
  - Construction (Build-to-Suit, Speculative, Pre-Construction, & Entitlement): Properties and/or investment strategies that require specialized expertise and should achieve the highest returns (primarily through appreciation but also through enhanced cash flow) due to the increased risk associated with development.
- Performance Rating: All assets will be classified as either “Performing,” “Watchlist,” or “Problem” using key performance metrics to monitor and manage risk.
- Investment Vehicle:
  - Operating Platform Investments (“OpCo”): For key investment strategies, the Real Estate Portfolio will acquire ownership stakes in operating/investment companies engaged in investment, development, and/or property and asset management on behalf of third-party investors or for its own account.
  - Separately Managed Accounts (“SMA”): The Real Estate Portfolio will target allocations to SMAs, a series of strategic relationships with real estate market and product specialists investors.
  - Other Investment Vehicles: The Pacing Plan will also allow for investments in REITs, co-investments, and commingled funds as these alternative vehicles may prove to be the most viable options for particular strategies. Moreover, continued exposure to commingled funds may also provide strategic benefits by allowing ASRS to invest alongside sophisticated managers that may not be open to a establishing an SMA, but that offer access to additional market intelligence and investment ideas.
- Model Allocation: The Real Estate Portfolio will target a Model Allocation based on a diversification of assets across property types, markets, and project life cycles, which will also include a number of constraints to ensure appropriate portfolio diversification and compliance with the SAA. Model Allocation will also limit the number of SMA managers to ensure operational efficiency of the program and effective monitoring of manager performance.
- Leverage: In addition to specific leverage at the investment or asset level, the SAA provides for utilization of portfolio leverage to facilitate implementation of tactical strategies to buy assets at favorable valuations as well as optimize cash management to further enhance overall returns.

MODEL ALLOCATION
ALLOCATION BY PROPERTY TYPE

- To ensure continuing relevance of the Real Estate Program's Model Allocation, RCLCO re-evaluated the risk and return profiles of the product types within the "Where People Live," "Where/How People Shop," and "Where People Work" categories in terms of historical performance and, more importantly, the likely go-forward performance based on long-term supply and demand fundamentals.
- Evaluation of historical performance validated ASRS' existing 50% relative "over-weighting" to "Where People Live": multifamily property has consistently outperformed retail, industrial, office, and hotel returns over the past 30 years on a risk-adjusted basis.
- The forward-looking analysis suggests that "Where People Live" should continue to be the most attractive product category due to strong underlying demand fundamentals and generally low risk factors. Additionally, the overall size and segmentation of the housing industry offers numerous and diverse investment opportunities. As such, housing will continue to have the largest product type allocation at 50% ± 10%.
- From a forward-looking perspective, "Where/How People Shop" scored slightly higher than the "Where People Work" category, largely due to strong underlying demand fundamentals within the Industrial sector. RCLCO shifted the Model Allocation from 35% "Where/How People Shop" and 15% "Where People Work" to 25% ± 10% for both categories for the following reasons:
  - Retail is facing the greatest acceleration of secular change among the property types due to changing consumer preferences regarding how to shop;
  - Industrial, on the other hand, is benefiting enormously from the same factors threatening retail, which is expected to continue. Increasing the investment allocation, however, is challenging due to inherent characteristics of this property type (e.g., long leases with low annual rent increases to large tenants) and intense competition in the space and resulting pricing pressure impacting originations;
  - Office investments, in general, face structural threats from changing work environments and needs, but individual investments, particularly in the best markets (e.g., where "21st-century" jobs are growing rapidly) and products (e.g., strong cyber infrastructure) that we would recommend owning for the long-term, have very large capital requirements. Health care-related properties continue to be desirable given the aging population and are relatively less impacted by challenges facing traditional office.
- Per the ASRS SAA, the Model Allocation will also allow for a maximum of 15% for Other investments including Agriculture, Infrastructure, Timberland, commingled funds and other investment vehicles that may not be readily classified within the "Live, Work, Shop" paradigm.
- Model Allocation will be managed tactically (buying and selling individually underwritten assets) but is a strategic target requiring on-going evaluation for relevance as market conditions change. RCLCO introduced specific buffers within the Model Allocation to enable ASRS to more effectively take advantage of attractive tactical investment opportunities and ensure continuing long-term compliance.

Recommended Model Allocation by Product Type Category



Note: ODCE has a current allocation of 30% to "Where People Live", 36% to "Where People Work", and 34% to "Where/How People Shop".

MODEL ALLOCATION
ALLOCATION BY RISK PROFILE

- The ASRS SAA benchmark return for the Real Estate Portfolio is the ODCE Index, though we aim to achieve a long-term absolute minimum net return of 8% for the Real Estate Portfolio, reflective of both real estate's long-term returns and ASRS' long-term actuarial needs.
- We recommend two broad strategies for achieving a net 8% total return over the long-term: 1) establish 8% as a minimum return target on all investments throughout their life cycles and 2) require a minimum level of higher risk/higher return investments in the Portfolio at any given time.

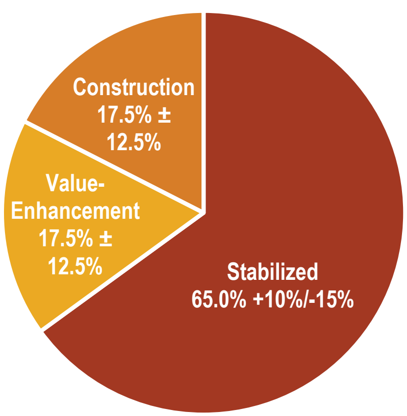
8% MINIMUM RETURN:

- All investments, as noted above, will be underwritten to achieve a minimum 8% total net return. Though the risks associated with this level of return change depending on the risk-free rate and the level of competition for investments in the market, achieving an 8% net return generally requires undertaking some business risk, such as leasing vacant space or growing rents more rapidly than expenses.
- Investment approach is to underwrite new investments to meet the minimum 8% total net return instead of mixing low risk/low return investments with high risk/high return investments to achieve the target return on a blended basis → mitigates investing too far out on the risk spectrum in order to counterbalance low return investments.
- As an individual investment or project moves through its life cycle, "go-forward" returns will likely decrease as values are expected to increases year-over-year, particularly upon completion of value-enhancement activities creating a "Stabilized Pool" to be managed as follows:
  - Stabilized assets will still be expected to achieve a minimum projected "since-inception" IRR of 8.0%;
  - Stabilized assets should achieve a minimum go-forward IRR of 6.0% and a cash-on-cash return in excess of 8%;
  - Assets that fail to meet these guidelines will be subject to further evaluation and likely be considered for disposition.

MODEL ALLOCATION
ALLOCATION BY RISK PROFILE (CONTINUED)

MINIMUM LEVELS OF RISK:

- The ASRS Real Estate Portfolio should primarily be comprised of assets generating strong income returns, particularly relative to their original investment bases.
- The Portfolio must continually rely on new, higher return, investments in order to maintain long-term yield targets, for two primary reasons:
  - As assets age, costs of maintenance and the risk of structural obsolescence increase;
  - As stabilized assets are reassessed at higher values, go-forward returns reduce as annual income is applied to higher bases and appreciation slows.
- We therefore recommend that the Real Estate Portfolio be managed to a target allocation of 65% +10%/-15% Stabilized assets, 17.5% ± 12.5% Value-Enhancement assets (Renovation and Lease-up/Roll), and 17.5% ± 12.5% Construction assets.
- The Stabilized allocation has a buffer of +10%/-15% → Portfolio should be overweight Stabilized assets leading into any recessionary period while still allowing for a greater allocation to both Value-Enhancement and Construction assets during expansionary periods; upper bound limit for Stabilized assets of 10% is geared to maintain an appropriate level of excess return.



Recommended Portfolio Segmentation by Risk Profile with Minimum Go-Forward Returns

Property Risk Profile	Base Case		Scenario 1: Max Value		Scenario 2: Max Stabilized	
	Portfolio %	Go-Forward IRR	Portfolio %	Go-Forward IRR	Portfolio %	Go-Forward IRR
Stabilized	65.0%	6.0%	50.0%	6.0%	75.0%	6.0%
Value-Enhancement	17.5%	10.0%	25.0%	10.0%	12.5%	10.0%
Construction	17.5%	14.0%	25.0%	14.0%	12.5%	14.0%
Total/Weighted Average Return	**100.0%**	**8.1%**	**100.0%**	**9.0%**	**100.0%**	**7.5%**

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REAL ESTATE PROGRAM: LONG-TERM VISION

20% REAL ESTATE ALLOCATION / 15 SMA MANAGERS

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TOTAL COMMITMENT: ~$12.0B (in 2027)

# Managers	15
RE Allocation	20%

LARGE MANAGERS

# Managers	4 - 5
Commitment Per Manager	$1,000M

STRATEGIES

- Identify high-performing strategic partners that align with ASRS' investment approach and can effectively manage a commitment of at least $1B.
- Consider a "one-off" investment manager program.
- One Multi-Asset SMA Manager's commitment inc'd to $B and working on a second $1B total commitment to another Multi-Asset SMA Manager.

COMMITMENT STATUS	AMOUNT
Current/Pending	$2,735M
Potential	$1,500M

REGIONAL & SPECIALIST

# Managers	8 - 10
Commitment Per Manager	$500M

STRATEGIES

- Includes current and new ASRS SMAs that continue to demonstrate success and alignment and can accommodate increased commitments (targeting ~$500M).
- Candidates include Self-Storage SMA Manager, Senior Living SMA Manager, Small Industrial SMA Manager and Others/TBD. Negotiating OA to increase commitment to $0.5B for SoCal Value-Add SMA Manager.

COMMITMENT STATUS	AMOUNT
Current/Pending	$1,900M
Potential	$300-$1,000M

TACTICAL/NICHE SMAs

# Managers	3 - 5
Commitment Per Manager	$100-$350M

STRATEGIES

- "Live/Work/Shop" niche strategies where capital commitments are expected to remain below $500M.

CANDIDATES

Grocery Anchored Retail SMA Manager	Suburban Office SMA Manager
"High St."/Strip Retail SMA Manager	Others/TBD
Total Commitment	$1,000M

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MODEL ALLOCATION
SUMMARY OF TARGETS AND CONSTRAINTS

CATEGORY	PARAMETER	REQUIREMENT
Property Type Model Allocation[1]	"Where People Live"	50% ± 10%
	"Where People Shop"	25% ± 10%
	"Where People Work"	25% ± 10%
	Other (non-classifiable investments including debt, Agriculture, Infrastructure and Timberland)	15% Maximum
Property Life Cycle or Risk Profile Segmentation	Stabilized	65% +10%/-15%
	Value-Enhancement	17.5% ± 10%
	Construction	17.5% ± 10%
Portfolio Geographic Allocation	% of portfolio in any single MSA	40% Maximum
	% of portfolio with non-U.S. exposure	30% Maximum
Leverage	Total portfolio leverage (LTV)	60% Maximum
Manager Relationships	Target Number of Managers	15 Maximum
Total Portfolio	% of ASRS portfolio in Real Estate	20% ± 10%

[1] The Portfolio will be managed to ensure classifiable Real Estate investments comply with the "Live, Work, Shop" allocation targets despite an allocation to Other.

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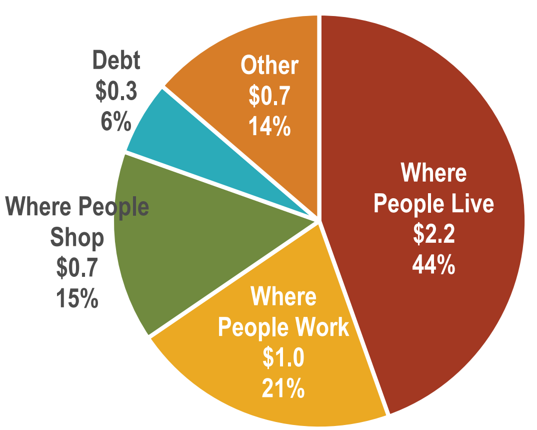
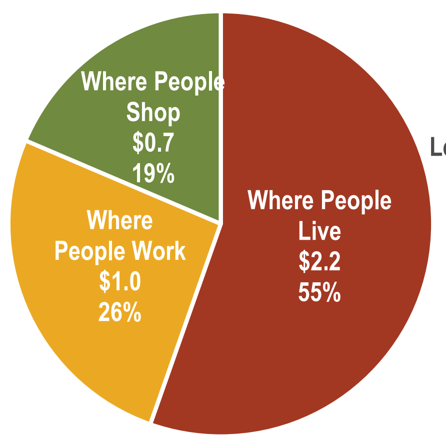
STATUS OF REAL ESTATE PORTFOLIO
AS OF Q4 2018

- Total Real Estate Portfolio ("RE Portfolio" or "Portfolio") NAV totaled roughly $4.9 billion as of Q4 2018, representing approximately 13.0% of the total ASRS fund (~$38.0 billion), which is $2.7 billion below the most recently approved SAA target allocation of 20.0%.
- The Portfolio is relatively in line with the Model Allocation targets:
  - Debt and Other investments comprise 20% of the Portfolio, exceeding the maximum target of 15% due to the recent reclassification of agriculture and infrastructure investments.
  - In terms of the "Live, Work, Shop" paradigm (i.e., excluding Other), "Where People Live" is slightly overweight at 55%, "Where People Work" is in-line at 25%, and "Where People Shop" is slightly underweight at 19%, although all categories are within the permitted tolerances of ± 10%.
  - In terms of investment vehicles, the Portfolio remains overweight in fund investments primarily due to remaining Legacy Portfolio funds and the recent inclusion of agriculture and infrastructure commingled fund investments. Nevertheless, portfolio composition continues to shift in favor of direct investments, which currently account for 62% of the RE Portfolio.
  - The Portfolio continues to be primarily comprised of Stabilized assets at 69%, which is in line with the target of 65% +10%/-15%. Of the remaining 31%, Value-Enhancement assets represent 14% of the Portfolio and Construction assets represent 17%—both within the target of 17.5% ± 12.5%.[1]
  - In terms of geographic or market exposure, ASRS is most heavily allocated in Los Angeles (19.6%), Washington, D.C. (11.5%), and San Francisco (10.8%). These allocations are well within the maximum 40% allocation within a single MSA.

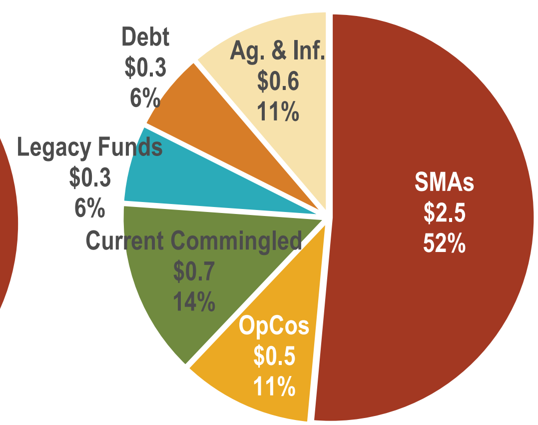
Total NAV by Property Category (Billions)



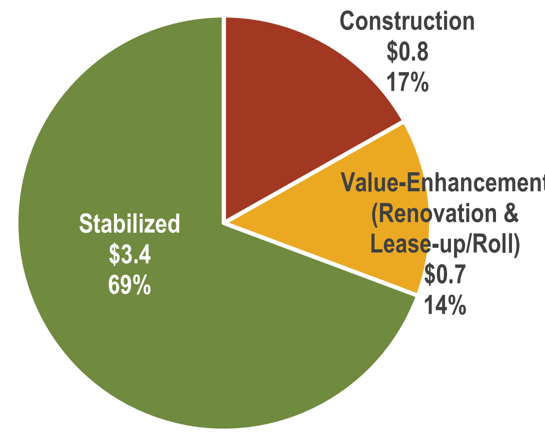
Total NAV by Property Category (Billions)[1]



Total NAV by Vehicle (Billions)



Total NAV by Risk Profile (Billions)



[1]Within the SMA portfolio, Value-Enhancement is comprised of 59% Lease-up/Roll and 31% Renovation assets, while Construction is comprised of 83% Speculative and 17% Build-to-Suit assets.
[2]Excludes Debt and Other investments (20% of the RE Portfolio)
Source: ASRS; State Street; RCLCO

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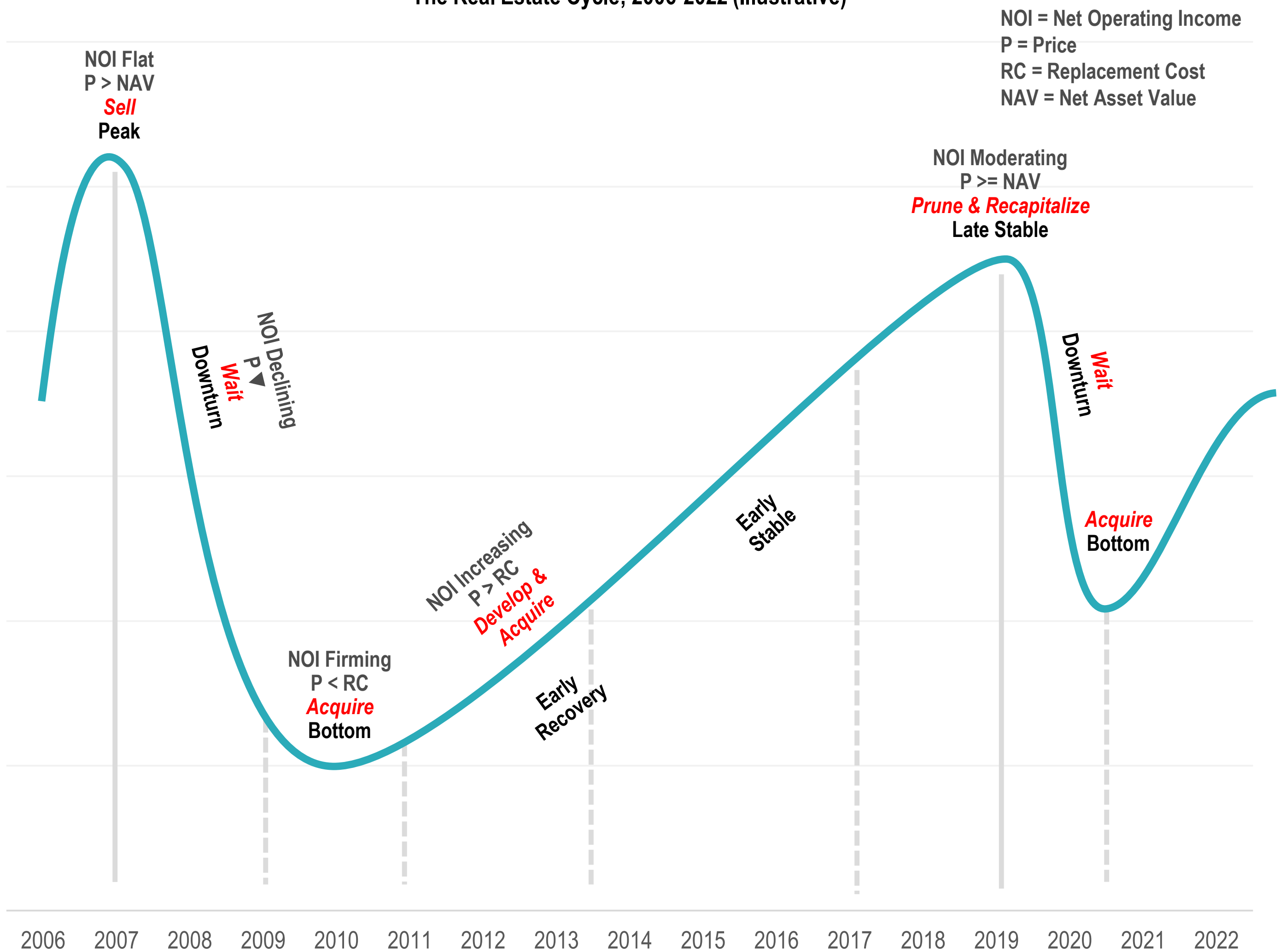
PACING RECOMMENDATIONS

OPPORTUNITIES AND CHALLENGES

REAL ESTATE CYCLE

- The economy and real estate markets have been in recovery at least since 2011.
- Real estate fundamentals are beginning to plateau (slowing rent growth and slightly increasing occupancy) for some products and in some markets.
- Capital markets are pricing real estate assets aggressively and are seeing some relaxation in lending standards, which are both expected to continue for at least the near-term.
- RCLCO's assessment is that the real estate market is in the late stable/mature phase for most product types and geographies. RCLCO sees a 25% probability of a modest downturn in 2019, with even odds of a downturn in 2020.
- At this time in the cycle, strategic activities therefore include:
  - Pruning the Portfolio of non-strategic assets;
  - Preparing/arranging "dry powder" for opportunistic investments during the bottom;
  - Selectively developing/constructing new "hold forever" properties where their value upon completion will be in excess of the cost to build;
  - Selectively acquiring interests in/recapitalizing operating or investment platforms that represent opportunities to enhance returns, increase alignment, and improve transparency;
  - Selectively investing in "hold forever" assets that can be acquired at prices below replacement cost.

The Real Estate Cycle; 2006-2022 (Illustrative)



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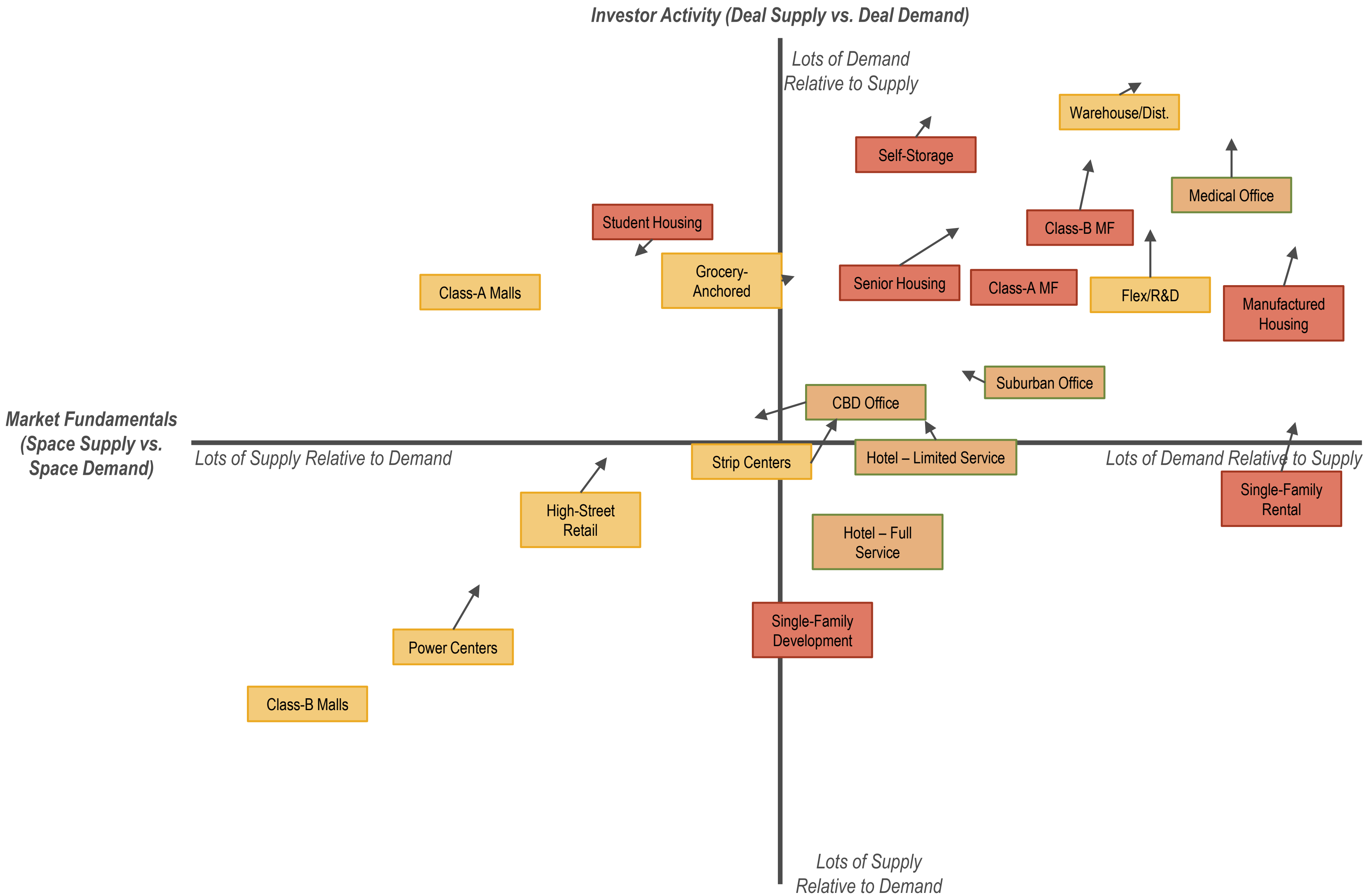
Source: RCLCO

PROPERTY TYPE TRENDS
INVESTOR ACTIVITY VS. MARKET FUNDAMENTALS



Note: (1) Red shading denotes "Where People Live" assets, orange shading denotes "Where People Work" assets, and yellow shading denotes "Where/How People Shop" assets.
(2) The arrows indicate the potential directions in which each respective product type may shift towards in the future.

2019 IMPLEMENTATION STRATEGY

PROJECTED DEMAND DRIVES RECOMMENDED STRATEGIES

	TRENDS AND THEMES	REAL ESTATE STRATEGIES	IMPLEMENTATION
LIVE	► Aging Millennials, Baby Boomers with longer lifespans ► Long-term shortage of single-family housing ► Home prices exceeding record highs; rentership becoming comparably more affordable ► Multifamily pricing at highest peak compared to other commercial property types ► Income inequality and heightened personal debt ► Urbanization	► Multifamily ► Single-Family Rental ► For-Sale Housing ► Seniors Housing ► Self-Storage ► Student Housing	► Sell Student Housing and prune Multifamily portfolio where appropriate ► Implement Single-Family Rental and For-Sale Residential SMAs ► Opportunistically continue Multifamily, Seniors Housing, and Self-Storage investment ► Consider: Active Adult Housing Investments/SMA ► Consider: Neighborhood Impact Strategy (urban/submarket impact investing in housing, schools, parks, etc.)
WORK	► Corporate profits at all-time highs and office-using employment growing ► Office space usage per employee consistently declining; freelancing economy ► Technology-enabled flexibility (e.g., WeWork, Cloud Computing) ► The workplace as a human habitat ► Large percentage of existing office stock may be structurally obsolete ► Growing need/demand for health care and medical office	► CBD Office ► Suburban Office ► Medical Office ► Evolving Health Care Real Estate ► Full & Limited Service Hotel	► Sell peak value/underperforming assets in Suburban Office and Medical Office portfolios ► Implement “NYC Sharpshooter” and Hospitality SMAs ► Continue opportunistic office investments through existing “Sharpshooters, Medical Office SMA, and Suburban Office SMA ► Re-tool office strategy by identifying future needs and trends (e.g., flex floor plans & lease terms, health/wellness, master leases, cyber infrastructure, etc.) ► Assess implementation of Large Manager - Office (SMA/OpCo?)
SHOP	► Industrial is the “new retail” through e-commerce, which is consistently growing in double digits ► Consumer spending and disposable income growing above historical averages ► Consumers want “less stuff, more fun” ► Increasing obsolescence of many retail centers ► Increasing segmentation of industrial properties	► Logistics-Based Industrial ► Strip/Small-Scale Retail ► Grocery-Anchored Retail ► Lifestyle Centers/Malls ► Redevelop/Repurpose Obsolete Retail	► Continue Industrial SMAs ► Assess implementation of Large Manager – Industrial (SMA/OpCo?) ► Consider: Strip/Small-Scale Retail SMA, “De-Malling”/Retail Conversion Strategy (potentially through sharpshooters), and/or High Street Retail Strategy
OTHER	► Internet of Things ► Edge Computing (closer to user data processing vs. off-site central data centers) ► Exponential growth in data usage and traffic	► Infrastructure	► Consider: Urban Core Data Centers (SMAs/Funds/REITs)

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THE PATH TO A 20% REAL ESTATE ALLOCATION

Year	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Model Allocation[1]	Pacing Impact ($M)
Strategic Activities (Net New)	Consider Disposition of Commingled Funds Excluding Strategic Relationships					TBD	TBD
	Assess Implementation of Large Manager - Industrial (SMA/OpCo?)		Implement Large Manager SMA/OpCo Investment	Implement Large Manager SMA/OpCo Investment	Implement Large Manager SMA/OpCo Investment	LWS	$650
	Assess implementation of Large Manager - Opportunistic Multi-Asset Strategy (SMA/OpCo?)						
	Assess implementation of Large Manager - Office (SMA/OpCo?)						
	Evaluate Real Estate Debt Investment Strategy						
	Design One-Off Investment Strategy & Structure (Large Manager SMA/OpCo?)						
Tactical Activities (Originations & Dispositions)	2H'19 Dispositions (Student Living Portfolio & Suburban Office SoCal Assets)	Dispositions (Denver MOB assets, Miami Retail assets)	Dispositions (Denver Suburban Office and Retail & Texas Suburban Office assets)	Dispositions (TBD)		LWS	($650)
	Transfer Multifamily SMA assets to ASRS	Consider Other Transfers (Stabilized Industrial, Medical Office, Self-Storage assets)				LWS	$213
	Consider Capital Commitment Increases to Top Performing Managers					TBD	TBD
	Implement MCR SMA					L	$400
	Implement Hospitality SMA					W	$200
	Implement Single Family Rental SMA					L	$100
	Implement For-Sale Housing SMA					L	$200
	Implement NYC Sharpshooter					LW	$300
	Consider Neighborhood Strip Center SMA		Implement New SMA/Investment	Implement New SMA/Investment	Implement New SMA/Investment	LWSO	TBD
	Consider High Street Retail SMA						
	Consider Neighborhood Impact Strategy (urban, sub-market impact investing in assets, schools, parks, etc.)						
	Evaluate REIT Strategy (Approach, Feasibility & Design)						
		Evaluate Other Real Assets Strategy (Agriculture/Timber/Infrastructure)					

TARGET FIVE YEAR NET EXCESS RETURN TO ODCE OF 1.5%[2]

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[1]Legend: L=Where People Live, W=Where People Work, S=Where/How People Shop, O=Other
[2]See slide 26 for detailed analysis of forecasted return expectations.

RETURNS ANALYSIS

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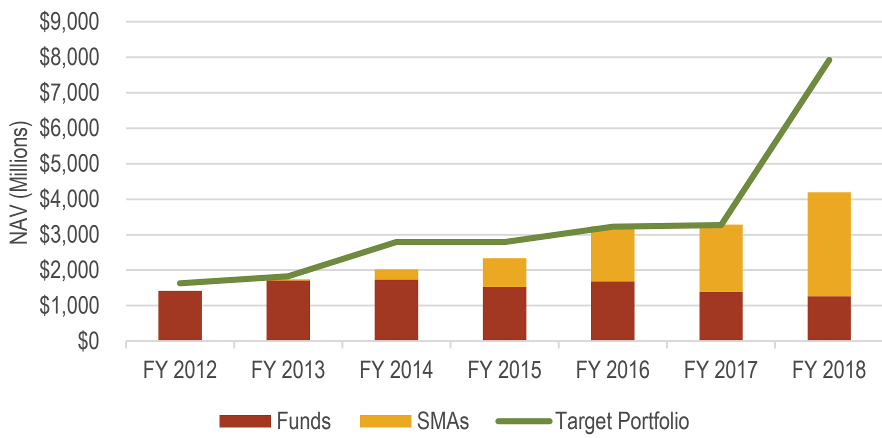
PROGRESS SINCE INCEPTION

- The ASRS Real Estate Portfolio has grown from $1.2 billion in FY 2011 to $4.9 billion in FY 2018[1].
- Since prior fiscal year end of June 30, 2017, the Portfolio has grown by roughly $900 million primarily due to a $360 million increase in SMA investments and the acquisition of MCR for $550 million, slightly offset by a decrease in Legacy and Debt fund investments.



	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total ASRS Fund NAV (Millions)	$28,000	$27,210	$30,500	$34,863	$34,862	$33,956	$37,211	$39,625
Target Allocation - Real Estate	6.0%	6.0%	6.0%	8.0%	8.0%	10.0%	10.0%	20.0%
Target Portfolio NAV (Millions)	$1,680	$1,633	$1,830	$2,789	$2,789	$3,396	$3,721	$7,925
RE Portfolio (millions)								
SMAs	$9	$14	$61	$417	$1,024	$1,844	$2,079	$2,439
OpCos	-	$55	$110	$181	$194	-	-	$554
Current Commingled	$49	$106	$235	$337	$350	$527	$615	$698
Legacy Funds	$1,309	$1,290	$1,361	$1,280	$1,011	$898	$397	$313
Debt	$24	$37	$89	$140	$152	$242	$357	$330
Agriculture & Infrastructure	-	-	-	$106	$479	$520	$562	$563
TOTAL	**$1,392**	**$1,502**	**$1,855**	**$2,460**	**$3,210**	**$4,031**	**$4,010**	**$4,896**
Allocation to Real Estate	*5.0%*	*5.5%*	*6.1%*	*7.1%*	*9.2%*	*11.9%*	*10.8%*	*12.4%*

- Portfolio composition continues to shift in favor of SMAs, which, as of FY 2018, represent 61% of Portfolio NAV.
- Since the first implementation plan in 2011, ASRS has committed approximately $6.1 billion to SMAs through CY 2019 YTD.

	COMMITMENT AMOUNT BY CALENDAR YEAR (MILLIONS)[1]															
STRATEGY/PROPERTY TYPE	**H1 2012**	**H2 2012**	**H1 2013**	**H2 2013**	**H1 2014**	**H2 2014**	**H1 2015**	**H2 2015**	**H1 2016**	**H2 2016**	**H1 2017**	**H2 2017**	**H1 2018**	**H2 2018**	**H1 2019**	**TOTAL**
Class A Apartments	-	$300	-	-	-	-	-	-	$50	-	-	-	-	-	-	$350
Warehouse and Distributions	-	-	$100	-	-	-	-	-	$15	-	-	-	-	-	-	$115
Seniors Housing and Medical Office	-	-	$200	-	-	-	-	($121)	-	-	$100	-	-	$121	-	$300
Student Housing	-	-	-	$100	-	-	$200	-	-	-	-	-	-	-	-	$300
Self-Storage	-	-	-	$100	-	-	-	-	-	-	-	-	-	-	-	$100
Multi-Asset Value-Add	-	-	-	$200	-	-	-	$200	-	-	-	-	$200	$100	$300	$1,000
Suburban Office	-	-	-	-	-	$100	-	-	-	-	-	-	-	-	-	$100
High-Street Retail	-	-	-	-	-	$100	$100	-	-	-	-	-	-	-	-	$200
Grocery-Anchored Shopping Center	-	-	-	-	-	-	$300	-	-	-	-	-	-	-	-	$300
Southern California Value-Add	-	-	-	-	-	-	-	$200	-	-	-	-	-	-	-	$200
Medical Office	-	-	-	-	-	-	-	$200	-	-	-	-	-	$300	-	$500
Class B Apartments	-	-	-	-	-	-	-	$300	-	-	-	-	-	-	-	$300
Mid-Scale Industrial	-	-	-	-	-	-	-	-	-	-	$150	-	-	-	-	$150
Small Scale/Bay Industrial	-	-	-	-	-	-	-	-	-	-	-	$150	-	-	$200	$350
Class A Apartments	-	-	-	-	-	-	-	-	-	-	-	-	$400	-	-	$400
Multifamily Preferred Equity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$300	$300
For-Sale Single Family / SFR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$400	$400
Hospitality	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$200	$200
NY/BOS Sharpshooter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$500	$500
TOTAL	**$0**	**$300**	**$300**	**$400**	**$0**	**$200**	**$600**	**$779**	**$65**	**$0**	**$250**	**$150**	**$600**	**$521**	**$1,900**	**$6,065**

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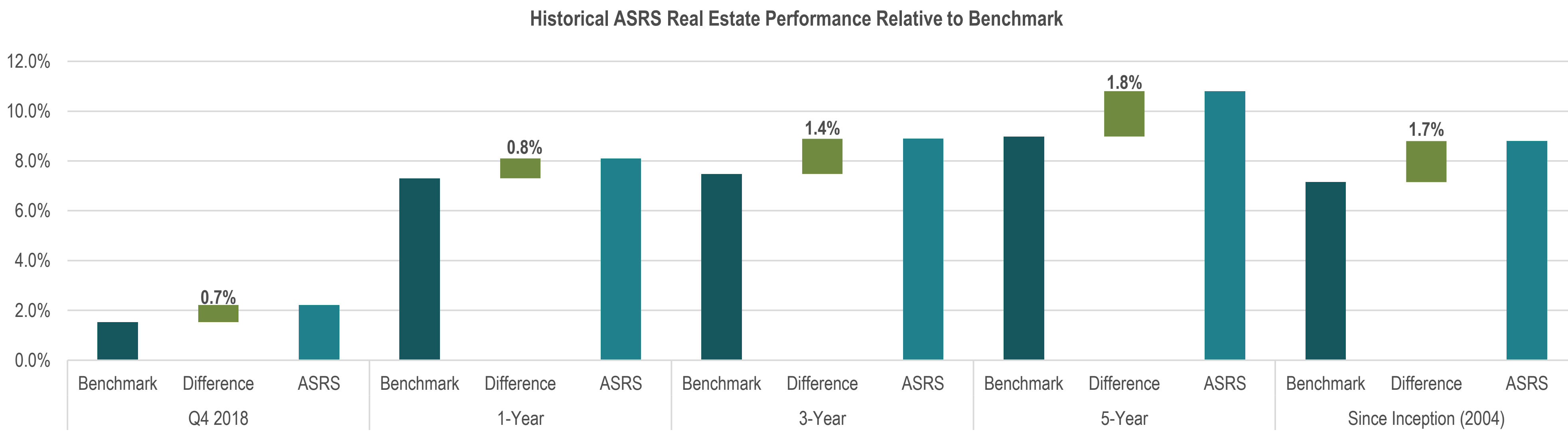
[1]Portfolio value further increased to $6.1B as of CY 2019 YTD.

RETURN ATTRIBUTION
LEVERS AND MEASUREMENT

- The ASRS Real Estate Portfolio is to be benchmarked against the NCREIF NFI-ODCE,[1] but portfolio performance will differ due to structural differences (or "levers"), which require measurement and monitoring to ensure we are maximizing value and returns.
- RCLCO has identified three levers that will primarily drive outperformance versus the NCREIF NFI-ODCE:
  - **Sector Weighting (calculated for SMAs):** the SMA portfolio is constructed based on a "Model Allocation" to "Live", "Work", and "Shop" assets, while ODCE's allocation by product type is dictated by the investment decisions of fund managers that contribute to the index. Historically, ASRS has had an overweighting to "Live" assets and an underweighting of "Work" and "Shop" assets compared to the benchmark allocation.
  - **Risk Profile or Life Cycle (calculated for SMAs):** the SMA portfolio has a target allocation of 25%-50% of Lease-up/Roll and Construction assets, compared to ODCE which has a limit of 20% to non-stabilized assets.
  - **Investment Vehicle:** the ASRS portfolio is comprised of separate accounts, operating companies, joint venture, commingled funds, and real assets, while ODCE is comprised entirely of open-end commingled funds.
- RCLCO, in conjunction with ASRS, will build a detailed attribution analysis process to determine how much each lever contributes to the outperformance (or underperformance) of the ASRS Real Estate Portfolio relative to the benchmark. This analysis, to be conducted over the next three months, will serve as a foundation for performance analysis of the portfolio. The analysis will be updated quarterly and included within each Implementation Plan moving forward.
- RCLCO conducted a high-level, five-year attribution forecast to estimate expected excess returns generated by the three levers. This analysis, is illustrated on the following three slides.



[1]*NCREIF NFI-ODCE is the leading benchmark for institutional real estate investors consisting of the market cap weighted net returns of ~20 institutional grade open end funds.*

Source: ASRS

FORECASTED SMA ATTRIBUTION

LEVER: SECTOR WEIGHTING

- Sector Weighting attribution calculates excess return generated by RCLCO's model allocation weightings by property type versus ODCE.
- To date, ASRS has not achieved since-inception excess returns through differences in sector weighting of the SMA portfolio compared to the benchmark.
- While ASRS has had a historical overweighting to Live assets compared to ODCE, multifamily assets within the ODCE portfolio have underperformed the benchmark over the past five years.
- RCLCO believes an overweighting to Live assets is appropriate and indicative of future performance consistent with both long-term historical results and respondents to PREA NPI forecast due to:
  - Long-term household growth, especially among older and younger households;
  - The ability to reprice multifamily assets more frequently (i.e., on annual or, in some cases, monthly bases) compared to office, retail, or industrial assets, which have considerably longer lease terms;
  - The ability to source attractive leverage on multifamily assets;
  - Deep market liquidity arising from diversity within the property type and very healthy transaction volume.
- For its forecasted attribution analysis moving forward, RCLCO utilized the PREA NPI forecast to estimate excess returns by sector within ODCE over the next five years. RCLCO also utilized the 30-year Core Real Estate forecast conducted by NEPC (7.0%) to forecast the performance of ODCE over the next five years, which slightly exceeds the 30-year historical net ODCE return of 6.4%.
- In the table below, it can be seen that Sector Weighting is expected to attribute 9 basis points of outperformance annually over the next five years.

5-YEAR FORECASTED SEPARATE ACCOUNT ATTRIBUTION (SECTOR WEIGHTING)

	INFORMATIVE INPUTS		FORECASTED ATTRIBUTION				
Sector	**Hist. NPI (30-yr)**	**PREA Forecast[1]**	**Forecasted Benchmark Excess[2]**	**SMA Weight**	**ODCE Weight (2018)**	**Active Weight**	**Sector Weighting**
Live	1.0%	0.3%	0.3%	50.0%	28.0%	22.0%	0.07%
Work	-1.0%	-0.6%	-0.6%	25.0%	35.0%	-10.0%	0.06%
Shop	0.8%	0.3%	0.3%	25.0%	37.0%	-12.0%	-0.04%
Sum / Weighted Avg.				**100.0%**	**100.0%**	**0.0%**	**0.09%**

Note: RCLCO utilized the 30-year Core Real Estate forecast conducted by NEPC (7.0%) to forecast the performance of ODCE over the next five years.
[1]Forecast NPI returns from 2019 to 2023 provided by the Q1 2019 PREA Consensus Forecast Survey.
[2]Reflects forecasted excess return of ODCE performance by Sector to overall ODCE performance.
Source: NCREIF; NEPC; ASRS; RCLCO

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FORECASTED SMA ATTRIBUTION
LEVER: LIFE CYCLE

- Life Cycle attribution calculates excess return generated by the performance of value creation activities (i.e., Value-Enhancement and Construction) compared to ODCE.
- Value Enhancement (i.e., renovation and lease-up) and Construction activities within the SMA portfolio have contributed to significant outperformance, yielding since-inception excess returns of 8.2% and 7.3%, respectively.
- For the forecasted attribution analysis moving forward, RCLCO derived excess returns by Life Cycle through a combination of historical portfolio returns and an aggregation of target returns by Life Cycle per the Investment Guidelines for each manager.
- RCLCO expects excess annual returns of 0.0%, 2.5%, and 5.5% for Stabilized, Value-Enhancement, and Construction assets, respectively, which represent slightly humbled returns compared to historicals and underwriting hurdles. The Life Cycle "lever" is expected to contribute140 basis points of outperformance annually relative to the benchmark over the next 5 years.

5-YEAR FORECASTED SEPARATE ACCOUNT ATTRIBUTION (LIFE CYCLE)					
	INFORMATIVE INPUTS		FORECASTED ATTRIBUTION		
Life Cycle	**Hist. (ASRS)**	**Investment Guidelines**	**Forecasted Active Excess[1]**	**SMA Weight**	**Life Cycle**
Stabilized	0.6%	1.5%	0.0%	65.0%	0.00%
Value-Enhancement	7.9%	3.0%	2.5%	17.5%	0.44%
Construction	7.1%	7.0%	5.5%	17.5%	0.96%
Sum / Weighted Avg.				**100.0%**	**1.40%**

- Overall, through the combination of Sector Weighting and Life Cycle attribution, the SMA portfolio is expected to outperform ODCE by 149 basis points annually over the next five years.
- While currently not possible due to data and process limitations, the attribution analysis will also include implementation of a data architecture to allow for calculation of tracking errors by Sector Weighting and Life Cycle to derive information ratios for the two levers. In the meantime, however, we have forecasted tracking error for the overall SMA portfolio to be 2.2% based on historical data.

Total SMA Excess = 0.09% (Sector Weighting) + 1.40% (Life Cycle) = 1.49%

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Note: RCLCO utilized the 30-year Core Real Estate forecast conducted by NEPC (7.0%) to forecast the performance of ODCE over the next five years.
[1]Reflects forecasted excess return of ASRS performance by Life Cycle to overall ODCE performance.
Source: NCREIF; NEPC; ASRS; RCLCO

FORECASTED RE PORTFOLIO ATTRIBUTION
LEVER: INVESTMENT VEHICLE

- Investment Vehicle attribution calculates excess return generated by the performance of the different investment vehicles within the ASRS portfolio compared to ODCE.
- To date, ASRS has achieved excess returns through investing in alternative investment vehicles, as indicated by considerably higher since-inception excess returns for separate accounts compared to funds.
- For the forecasted attribution analysis moving forward, RCLCO utilized the excess return expectation for SMAs (calculated on the prior two slides) and worked with ASRS to forecast the 5-year return expectations for the other investment vehicles based upon historical performance. Future go-forward return expectations are "humbled" compared to historical since inception excess returns.
- Overall, the ASRS Real Estate portfolio is expected to outperform the ODCE benchmark by 153 basis points annually over the next 5 years.
- Utilizing historical tracking errors by investment vehicle calculated by ASRS and the forecasted expected returns by investment vehicle, we calculate a 5-year forecasted information ratio of 0.58 for the overall real estate portfolio, illustrating positive forecasted risk-adjusted excess returns to the ODCE benchmark.
- Furthermore, we forecast information ratios of 0.68 for SMAs and 0.89 for Operating Companies, highlighting the positive expected benefits of direct investing.

5-YEAR FORECASTED PORTFOLIO ATTRIBUTION (INVESTMENT VEHICLE)

	INFORMATIVE INPUTS	FORECASTED ATTRIBUTION			INFORMATION RATIOS	
Investment Vehicle	**Hist. (ASRS)**	**Forecasted Excess**	**Forecasted Weight**	**Weighted Effect**	**Tracking Error[1]**	**Information Ratio[2]**
Separate Accounts	5.1%	1.5%	57.0%	0.85%	2.2%	0.68
Current Commingled	1.5%	1.0%	14.0%	0.14%	3.5%	0.29
Legacy	-0.3%	-1.0%	3.5%	-0.04%	3.0%	-0.33
Debt	2.2%	1.5%	4.5%	0.07%	2.5%	0.60
Operating Company	9.4	4.0%	11.0%	0.44%	4.5%	0.89
Farming / Infrastructure	1.9%	0.7%	10.0%	0.07%	2.0%	0.35
Sum / Weighted Avg.	**1.7%**		**100.0%**	**1.53%**	**2.7%**	**0.58**

Note: RCLCO utilized the 30-year Core Real Estate forecast conducted by NEPC (7.0%) to forecast the performance of ODCE over the next five years.

[1]Tracking Error = $\sigma (R_{portfolio} - R_{benchmark})$

[2]Information Ratio = $(E[R]_{portfolio} - E[R]_{benchmark})$ / (Tracking Error)

Source: NEPC; ASRS; RCLCO

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